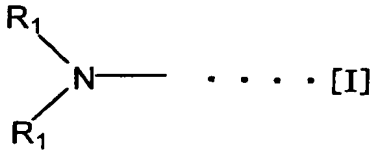
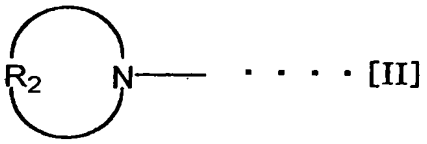
CLAIMS

1. A rubber composition using a modified conjugated diene polymer, characterized by comprising (A) 100 parts by mass of a rubber component containing not less than 10% by mass of a conjugated diene polymer having a polymer chain with at least one functional group selected from the group consisting of a substituted amino group represented by the following formula (I):



[I]

(wherein R_1 is independently an alkyl, cycloalkyl or aralkyl group having a carbon number of 1-12) and a cyclic amino group represented by the following formula (II):



[II]

(wherein R_2 is an alkylene group having 3-16 methylene groups, a substituted alkylene group or an oxy- or N-alkylamino-alkylene group); (B) not less than 20 parts by mass of carbon black and (C) not more than 1.0 part by mass of a polycyclic aromatic compound (PCA).

2. A rubber composition according to claim 1, wherein the conjugated diene polymer is a copolymer of butadiene and an aromatic vinyl compound or a homopolymer of butadiene.

3. A rubber composition according to claim 2, wherein a vinyl bond content in butadiene portion is not more than 25%.

4. A rubber composition according to claim 2 or 3, wherein a content of the aromatic vinyl compound as a copolymer component is not more than 10% by mass.

5. A rubber composition according to any one of claims 2 to 4, wherein the aromatic vinyl compound as a copolymer component is styrene.

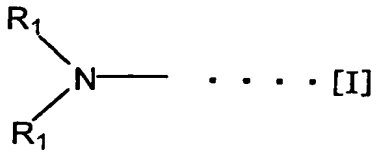
6. A rubber composition according to claim 2 or 3, wherein the conjugated diene polymer is polybutadiene.

7. A rubber composition according to any one of claims 1 to 6, wherein the conjugated diene polymer has a glass transition temperature (Tg) of not higher than -50°C.

8. A rubber composition according to any one of claims 1 to 7, wherein R_1 in the formula (I) is methyl group, ethyl group, butyl group, octyl group, cyclohexyl group, 3-phenyl-1-propyl group or isobutyl group.

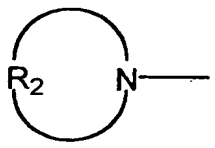
9. A rubber composition according to any one of claims 1 to 7, wherein R_2 in the formula (II) is tetramethylene group, hexamethylene group, oxydiethylene group, N-alkylazadiethylene group, dodecamethylene group or hexadecamethylene group.

10. A rubber composition according to any one of claims 1 to 9, wherein the conjugated diene polymer is formed by forming a solution of one or more anion-polymerizable monomers consisting essentially of 1,3-butadiene in a hydrocarbon solvent, and then polymerizing the monomers with (D) a lithioamine represented by a general formula of $(AM)Li(Q)_y$ (wherein y is 0 or about 0.5 to 3, and Q is a soluble component selected from the group consisting of a hydrocarbon, an ether, an amine and a mixture thereof, and AM is the formula (I):



[I]

(wherein R_1 is the same as mentioned above) or the formula (II):



[II]

(wherein R_2 is the same as mentioned above)) or a mixture of the item (D) and (E) an organic alkali metal compound as a polymerization initiator.

11. A rubber composition according to any one of claims 1 to 10, wherein the conjugated diene polymer has at least one tin-carbon bond or silicon-carbon bond derived from a coupling agent of a formula: $(R_3)_aZX_b$ (wherein Z is tin or silicon, and R_3 is selected from the group consisting of an alkyl group having a carbon number of 1-20, a cycloalkyl group having a carbon number of 3-20, an aryl group having a carbon number of 6-20 and an aralkyl group having a carbon number of 7-20, and a is 0 to 3, b is 1 to 4 and a+b = 4).

12. A rubber composition according to any one of claims 1 to 11, wherein not less than 20% by mass of natural rubber and/or polyisoprene rubber is included in 100 parts by mass of the rubber component containing the conjugated diene polymer.

13. A rubber composition according to any one of claims 1 to 12, wherein carbon black as the component (B) has a nitrogen adsorption specific surface area (N_2SA) of not less than 70 m^2/g.

14. A rubber composition according to any one of claims 1 to 13, wherein PCA as the component (C) is derived from a softening agent.

15. A rubber composition according to any one of claims 1 to 14, wherein an extractable of the rubber composition after vulcanization with acetone-chloroform is not more than 20% by mass per the mass of the rubber composition after vulcanization.

16. A tire characterized by using a rubber composition as claimed in any one of claims 1 to 15.

17. A tire according to claim 16, wherein the rubber composition is applied to a tread.

18. A tire according to claim 16 or 17, wherein the tire is a heavy duty tire.